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ABSTRACT

The effect of an aerobic exercise program on the anxiety levels of recovering alcoholics was studied. Two groups of 25 volunteers each, from 3 alcoholism/rehabilitation programs in New Jersey, were assigned to control and experimental groups. Both groups received pre- and post-tests of the Spielberger State-Trait Anxiety Inventory. The control group was instructed not to exercise for the 4-week test period. The experimental group received the aerobic exercise treatment program in which the subjects exercised three times a week for 15-30 minutes. Pulse rates during exercise were kept at 60 to 80 percent of maximum for the exercise session. Post-test anxiety scores of the experimental and control groups did not reveal a statistically significant difference in anxiety levels. However, pre- and post-test scores for the experimental group were significantly different, suggesting that the treatment may have had the desired effect. (ABL)

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ABSTRACT

"THE EFFECTS OF AN AEROBIC EXERCISE PROGRAM ON ANXIETY LEVELS OF RECOVERING ALCOHOLICS"

BY

LEWIS J. LUCARINE

The following thesis is the result of an experimental study testing the effects of an aerobic exercise program on the anxiety levels of recovering alcoholics. The researcher, a program specialist with the New Jersey Division of Alcoholism, cites the little-used role of physical rehabilitation in traditional alcoholism treatment programs. Despite the fact that alcohol related diseases account for 30 to 50 percent of all hospital admissions and much has been written and studied about this disease--physical exercise is often ignored in its treatment.

The purposes of this study are (1) to seek, develop, and implement an exercise program for recovering alcoholics in order to contribute to the field of alcoholism treatment by addressing this neglected area; (2) to familiarize recovering alcoholics with an alternate outlet (to alcohol) for psychological stress; and (3) to determine whether the four week aerobic exercise regimen developed for this study did significantly reduce levels of state and trait anxiety as indicated by the Spielberger State-Trait Anxiety Inventory.

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Two groups of twenty-five volunteers each were preselectively assigned to control and experimental groups. The control group (Group One) received the pre- and post tests (the Spielberger State-Trait Anxiety Inventory-STAI) They were specifically instructed not to exercise for the four-week period. Group Two (the experimental group) was given the pre and post tests and the treatment.

The treatment consisted of a four week aerobic exercise plan during which the subjects worked out three times a week for 15-30 minutes. Pulse rates during exercise were kept at 60-80 percent of maximum for the entire exercise session. The subjects were extensively instructed in pulse taking and this aspect of the study was comprehensively monitored. Subjects chose from three exercise plans to relieve monotony.

A t-test analysis comparing post-test anxiety scores of the experimental and control groups did not reveal a statistically significant difference in anxiety level. However, a significant difference did occur in a comparison of pre to post tests within the experimental group revealing a significant difference in their post-test anxiety level scores.

TRENTON STATE COLLEGE

TRENTON, NEW JERSEY 08625

"THE EFFECTS OF AN AEROBIC EXERCISE PROGRAM ON ANXIETY LEVELS OF RECOVERING ALCOHOLICS"

A Thesis Submitted in Partial

Fulfillment of the Requirements for the Degree

of Master of Education in Health and Physical Education

by

Lewis J. Lucarine

Approved by the Thesis Committee

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Special thanks to "Doc" Wheeler, Jeff Lang and Earl from A.A.

Finally, but most especially, thanks to my mother-in-law, Beverly Hoffman, for her tireless typing; and to my parents for giving me the opportunity for an education.

This thesis is dedicated to Debbie, my wife, my friend.

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CHAPTER ONE

1. INTRODUCTION

As a program specialist for the New Jersey Division of Alcoholism, whose chief function is to develop and review alcoholism treatment programs, the investigator has had ample opportunity to observe and critique various modes of treatment for alcoholism. Indeed, most treatment programs the researcher has observed make no provision for any type of physical activity in the rehabilitative process.

Observations by Gary and Guthrie (1972) confirm that poor physical condition contributes to recovering alcoholics low self-regard, self-acceptance, and feelings of inadequancy. In addition to improving self-concept, aerobic activity could also be expected to alter other personality variables such as emotional stability, mental alertness and ease of withdrawal. Withdrawal from the drug of alcohol is usually a very unpleasant experience which can include irritability, nausea, hallucinations and many other side effects. These symptoms may be lessened by regular aerobic exercise.

Jones (1968), McCord, McCoy and Gudeman (1960), and Fox (1965) have concluded that alcoholics are unable to cope adequately with overwhelming dependency needs. In their formative years they reacted to these frustrated needs by stressing aggressiveness, masculinity and independence. They reported that drinking helped to bolster self-image

(Williams, 1967). As time passes, the individual progresses from problem drinking to alcoholic behavior and experiences increasing difficulty and eventual failure in meeting the role requirments for autonomy and independence (Hurwitz and Lelos, 1968). Dependency needs emerge (Conner, 1962) and self-esteem decreases further (Vanderpool, 1969).

Improved physical conditioning, which is usually identified with aggressive, sexually adequate and other wholesome, healthy attributes could be expected to contribute to re-establishing counterdependent defenses and reducing the pressure for continued alcoholic behavior (Gary and Guthrie, 1972). Keller (1980,p.118) states, "As physical fitness improves, so does autonomic recovery from psychological stress. Hence, physically adept persons may cope better with psychological stress than the unfit."

Alcoholism is generally defined as a disease in which the victim has lost control over drinking to the point where it interfered with his family and social relationships or his job performance. Although he may have begun as a social drinker, his system has become progressively tolerant to and dependent upon alcohol. Although he may want to, he is unable, on his own, to stop drinking permanently. Most experts now agree that while inner conflict and stress can precipitate heavy drinking, the deep psychological problems often characteristic of alcoholics are a consequence rather than a cause of the disease.

Scientists have found that alcohol wreaks a certain common havoc on the psyche, which is perhaps even more insidious than the physical damage. Over a period of time, alcohol abuse alters brain-cell function, induces nerve damage, shrinks the cerebral cortex, and so imbalances the hormonal system that some doctors think it induces the body to shut off production of natural euphoriants. The alcoholic, particularly in the early or middle stages, may be able to function, but his productivity will be hampered; his psychological disequilibrium will magnify small problems, render him unable to cope effectively with stress, prevent him from seeing the reality of a situation and paralyze the normal process of emotional maturing so that he is unable to digest and assimilate the lessons of experience. Because alcohol blurs personal insight, years of psychotherapy are often ineffective unless the alcoholic becomes abstinent. Much of an alcoholic's psychological and spiritual turmoil lifts after a year or two of sobriety (Franks, 1985).

a. STATEMENT OF THE PROBLEM

Although alcoholism is viewed as a multifaceted disorder, there has been little systematic analysis of the role of physical rehabilitation in alcoholism treatment (Chafetz, 1979).

Some of the most serious diseases associated with chronic alcohol abuse include cancer of the liver, larynx, esophagus, stomach, colon and breast, as well as malignant melanoma. Alcoholism also leads to high blood pressure, stroke and heart attack; damage to the brain, pancreas and kidneys (diabetes, renal failure); stomach and duodenal ulcers, colitis and irritable colon, birth defects and fetal alcohol syndrome, impotence and infertility; premature aging, and a host of other disorders such as muscle cramps, diminished immunity to disease, sleep disturbances and edema. In fact, alcohol related diseases account for 30 to 50 percent of all hospital admissions (Franks, 1985).

In the past few years there has been great concern, by the public as a whole, over aerobic or endurance fitness. Programs which emphasize aerobic fitness require participation for 15-30 minutes three times a week, with an intensity effort of from 60 to 80 percent of maximum pulse rate. Physiological adaptations take place following several weeks of regular participation in a graded exercise program: the adaptations include reduced basal and working heart rate, lowered blood pressure, increase in muscle tone, increase in maximum oxygen uptake and delayed onset of fatigue (Astrand and Rodhal, 1977; and Fox, 1980). Additionally, numerous psychological adjustments have also been noted including: lowered anxiety, improved self-esteem,

and greater self-confidence (Folkins and Amsterdam, 1977; Ismail and Young, 1977). Based on these findings, the researcher is of the opinion that aerobic exercise will prove to be most beneficial in the recovery from alcoholism.

b. STATEMENT OF THE PURPOSE OF THE STUDY

The purposes of this study are:

1. To develop and implement an aerobic exercise program for recovering alcoholics.

2. To familiarize recovering alcoholic persons with an alternative outlet (to alcohol) for psychological stress and to contribute to the field of alcoholism treatment by utilizing a component (aerobic exercise) that is not used in the majority of alcoholism treatment programs.

3. To determine whether the four week aerobic exercise regimen developed for this study will significantly reduce levels of state and trait anxiety as indicated by the Spielberger State-Trait Anxiety Inventory.

c. STATEMENT OF THE HYPOTHESIS

This study will be conducted to develop and analyze an aerobic exercise program by testing the following hypothesis:

1. This experimental group will develop a significantly lower anxiety level than the control group as determined on the post test of the Spielberger State-Trait Anxiety Inventory.

d. LIMITATIONS

The following limitations are recognized pertaining to the study:

1. Because of extreme difficulty in locating a willing sample group and facilities, the total sample is limited to fifty (50) participants. This small sample size will limit the use of the data in its' application to the alcoholic population on the whole.

2. The original experiment was designed with a group of fifteen from M.A.P. as the experimental group and a group of fifteen from Turning Point as the control group. However, since these two groups total only thirty (30) in number, the graduate committee agreed to allow subjects from local Alcohol Anonymous groups to participate. Upon this allowance by the committee, the researcher recruited approximately twenty (20) volunteers from A. A. and arbitrarily assigned them to groups. These recruits were both men and women, ages eighteen (18) to sixty (60), with less than two years of sobriety. The investigator gave them extensive personal instruction in aerobic technique. (By orientation, demonstration, and bi-weekly check-ins.) The limitation of extent of supervision must be cited here however, as the researcher had no staff monitoring of daily activity, only subjects' word.

3. The study was originally planned to last six weeks. However, the researcher found only two accessible alcoholism

treatment programs willing to take part in the study. Both were four week programs. As the researcher investigated further, however, he discovered the majority of New Jersey alcoholism treatment programs are 28 day programs. This is in view of the fact that medical insurance covers alcoholism treatment for 28 days--thus the field's 28 day program designs. In view of these facts, the length of the program may be a limitation of the study.

e. DELIMITATIONS

The application of data collected in this study has been delimited to volunteers from three New Jersey based alcoholism treatment programs: M.A.P. (Mutual Agreement Program) located in Williamstown, N.J.; Turning Point Twenty-eight Day Alcoholism Treatment Program, Verona, N.J.; and volunteers from several Alcoholics Anonymous Groups.

The number of subjects involved in the sample was fifty (50): twenty-five subjects from M.A.P. and A.A. in an experimental group and twenty-five subjects from Turning Point and A.A. in a control group. Testing procedures were conducted for one year. Subjects were males and females ages 18-60. (For more information see Chapter III.)

f. -DEFINITION OF TERMS

Anxiety - Painful uneasiness of mind usually over an anticipated ill. Anxiety will be measured by the Speilberger State-Trait Anxiety Inventory (See Instrument). (Webster, 1972) For purposes of simplicity in the study this definition was used; it may differ from those descriptions of anxiety found in abnormal psychology textbooks.

Recovering Alcoholics - For the purpose of this study "recoverng alcoholics" shall be persons whose consumption of alcoholic beverages affected their lives in a negative psychological, social or economic manner. Such persons shall have been sober (without alcohol consumption) for less than two years (New Jersey Division of Alcoholism, 1986).

Aerobics - Programs in which an individual exercises for 15-30 minutes, three times per week with an intensity effort of from 60 to 80 percent of maximum pulse rate. (Further information in Statement of the Problem.) (Cooper, 1970).

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Numerous studies have been conducted concerning the beneficial effects of exercise on anxiety, although research is limited on its benefits to recovering alcoholics. Among them, Sinyor (1982) compared non-exercising control groups with experimental exercising groups. He found that the exercising groups had higher rates of alcohol abstention at three months of follow-up.

Powell and Paffenberger (1985) determined that physical activity and exercise does alleviate the symptoms of mild to moderate depression. They found that in the general population, exercise reduces the symptoms of anxiety.

The effects of exercise on anxiety have been attributed to diversion, social reinforcement, experience of mastery, and improved response to stress through reduced muscle tension, heart rate, skin conductance, and catecholamine, glococorticoid or lactate production (Hughes, 1984). Such benefits would be most effective in treating alcoholics who have higher incidences of depression, anxiety, hysteria, sociopathy, drug abuse, anorexia nervosa, and childhood hyperactivity than the general population (Morrison and Steward, 1971).

Studies by Murphy, et al (1972) and Frankel and Murphy (1974) confirmed that alcoholic subjects had positive changes in depressive attitudes and other subscales (guilt, self-esteem, and self-confidence) of the Minnesota

Multiphasic Personality Inventory. Subjects who exercised regularly for several weeks significantly improved scores in positive areas of this personality scales test. (Depressive attitudes were improved, etc.) After a three week physical fitness program, Gary and Guthrie (1972) found that jogging for twenty days with twenty chronic alcoholics increased self-esteem on self-concept scales.

Pursch (1980) manipulated physical fitness to determine whether improvement in fitness levels hastens recovery from psychological stress, similar to that incurred by alcoholics. Sixty subjects were randomly assigned to either exercise, music appreciation, or meditation classes which met four days weekly for ten weeks. Fitness was inferred from heart rate recovery following a step test, and psychological fitness from skin conductance recovery during emotionally stressful tasks. At the conclusion of the study, the experimental group recovered significantly faster from physical and emotional stress than the other groups.

a. ANXIETY AND ALCOHOL

Kinney and Leaton (1983) state that a recovering alcoholic is likely to face a multitude of problems. One of these is a high level of anxiety. It can be of a temporary nature, the initial discomfort with the non-drinking life, or more chronic if one is the "nervous" type. The alcoholic has a very low tolerance for such a state. Many alcoholics have used alcohol for the temporary and quick relief of

anxiety. What is recognized is the almost instant relief from anxiety a large swig of booze brings. When alcohol or drugs are no longer an option, the alcoholic has quite a problem: how to deal with anxity.

Some anxiety is necessary for normal, healthy functioning; it is an internal sign of potential danger and at times is essential for preservation of life. The alcoholic, however, uses the alcohol as an anti-anxiety agent to "turn off" anxiety and create a false sense of well being. The individual using anti-anxiety agents will still intellectually know what is happening, but the emotional impact is blunted. The active alcoholic has plenty to be anxious about.

Wallace (1982) states that remorse, shame, and self-hatred form a group of inner feelings that are much in evidence in any collection of alcoholic people. The self-esteem of the alcoholic is literally shattered. Despite the surface picture of grandiosity, excessive self-confidence, and narcissism evident in some alcoholics, the facts are usually to the contrary. Beneath the confident exterior, the alcoholic is typically a frightened person, overflowing with self-doubt and self-loathing. Usually it takes many years of complete sobriety for him to overcome guilt feelings and a negative self-image.

Underlying guilt and low self-esteem are evidence by such traits as lack of self-assertion, striving for

perfection, inordinate need for approval from others, compulsive patterns of overwork, permitting oneself to be used and manipulated by others and neglect of self-interest. Feelings of loneliness, alienation, and apartness from others are also found routinely among alcoholic people.

It is often the case that alcoholics feel absolutely unique, and quite different from others. These feelings of uniqueness of personality and life situation accentuate and contribute to the alcoholic's alienation from others and estrangement from self as the disease progresses.(Wallace, 1982)

Depression and feelings of hopelessness, futility, and a pervasive sense of meaninglessness in life further complicate the inner world of alcoholics. It is not surprising to find feelings such as these in alcoholic people when we remember that alcohol is classified in psychopharmacology as a nonselective general depressant. In structure and/or effect on the central nervous system, alcohol is indistinguishable from other CNS depressants such as Ether, Diazepam (Valium), Cholordiazepoxide (Librium), and Phenobarbital. The direct negative effects of alcohol on mood are well known to anybody who has worked closely with alcoholics in detoxification and rehabilitation programs. A transient depression that yields quickly to brighter spirits as detoxification proceeds is commonly seen in hospital recovery programs. In truth, while they are usually totally unaware of it, alcoholics are often depressed because they

drink large quantities of a depressant drug (Wallace, 1982).

The National Council on Alcoholism's Criteria Committee (1982) maintain that the effects of alcohol on the rising slope of the absorption curve parallel the four stages of anesthesia, and thus excited or uninhibited behavior may be shown with mild inebriation. But it has also been documented that with large doses over a prolonged period of time, alcohol produces anxiety. Whether this biomodal effect occurs as a regular result of any amount of alcohol is currently being investigated (NCA Criteria Committee, 1982). The progressive rise of anxiety with continued heavy drinking is responsible for many of the effects listed as minor criteria (for alcoholism).

Blum (1985) has linked alcohol with the opiate system in the central nervous system. Some animal experiments have suggested that alcohol is metabolized into opiate-like compounds, tetrahydroisoquinolines (TIQ's), which act on the same nerve receptors as do morphine and endorphins, the body's naturally produced opiates. Chronic heavy consumption of alcohol tricks the body into shutting down the natural production of endorphins, because its TIQ metabolites mimic the action of opiates. This robs the alcoholic, as soon as the high of alcohol wears off, of any normal feeling of well-being. On the basis of animal experiments, endorphin levels do not return to normal, even after long periods of abstinence.

Tabakoff (1985) believes that alcohol provides a "Reinforcing Quality in the reward system of the brain. Some alcoholics, particularly episodic drinkers who down great amounts in one sitting, talk of a rush of intense euphoria, of sudden cosmic understanding, of sensations of power, brilliance and absolution. Experiments conducted on animals indicate that some alcoholics may have a metabolic anomaly which causes alcohol to stimulate pleasure more than in normal people, thereby creating a dependency.

Vaillant (1985) analyzed a 40 year history of 600 men from two populations - a Harvard University group and a poor inner-city group. He found that those who developed alcoholism had no prior (psychological) problems; instead, once a person lost control over alcohol, psychological problems began. No indication was givewn as to original loss of control over alcohol.

b. EXERCISE AND ANXIETY

De Vries (1982) has studied the value of exercise as relief from anxiety. He studied 10 patients, ages 52-70. All showed above average anxiety tension. During one test, the patients took the drug meprobamate in a 400-milligram dose. On another day, they took a walk vigorous enough to raise their heart rates above 100 beats per minute. The walk had the greater calming effect, as measured by reduction of muscle action and heart rate. Fifteen minutes of walking

soothed the patients for an hour after they'd stopped walking. Much of De Vries work involves the study of endorphins or the brain's natural pain-modulating systems. These endorphins, or "beta-blockers" apparently imitate the type of "high" a heroin addict received from that drug, and moderate the pain a person experiences.

Cooper (1968) confirms that aerobic exercise does psychological wonders. In his landmark work "Aerobics" he states that there is a definite relationship between physical fitness, mental alertness, and emotional stability. These findings are based on studies of hundreds of men and women at the "Aerobics Center" in Dallas, Texas.

Ismail and Tractman (1973) tested personality changes from aerobic exercise using the Cattell 16 Personality Factor Questionnaire. They separated the subjects into two groups: high-fitness (at the start) and low fitness. The Cattell Questionnaire rates 16 traits on a ten-point scale. (Above six is "high", below four is "low.") The doctors chose four traits as most important to this study: (1) emotional stability; (2) imagination; (3) self-sufficiency; and (4) guilt-proneness. Runners, they figured should score well in the first three, and have a low score in the fourth (which is an indication of self-assurance, or a lack of guilt-proneness). The high fitness group scored as expected, and was consistent from start to finish. "Imagination" was

their best feature. The low-fitness group's ratings soared in the first three categories--particularly in "self-sufficiency", where, in post tests they shot past the more seasoned runners. The beginners' emotional stability increased so markedly that there no longer was a significant difference between the groups at the conclusion of the study.

Fort (1982) writing on the response of high density lipoproteins (HDL's) and psychological stress to aerobic exercise found that in both males and females exercise significantly decreased stress. HDL levels increased in both males and females studied, indicating some relationship between exercise and lowered anxiety levels. (HDL's are beneficial to the body systems.)

Haas (1981) found a significant association between stress-coping health and activity in the following ways: individuals with high stress levels who are healthy have high activity levels. Individuals with high stress levels who are not healthy have low activity levels.

Giordano and Everly (1984) report that the most efficient use of the physical arousal (anxiety) response is physical exercise. The increased energy intended for fight or flight can be used simply in running or swimming or riding a bike. Thus, one can accelerate the dissipation of the stress products, and if the activity is vigorous enough, it can cause a rebound or overshoot after exercise into a state of

deep relaxation.

Exercise to reduce stress should not add stress which lingers after exercise. Ideally, it should be exercise which is devoid of ego involvement. Though strenuous, it should be a time of peace and of harmonious interaction of mind and body. And in that sense, it may be the most natural of the stress reduction techniques.

Exercise which is void of ego involvement is that in which the person competes with no one--not even themselves (Dusek Girdano, 1984). Dusek-Girdano (1984) further states that physical activity is a natural way of putting mind-body back together. We have begun to realize that physical inactivity results in degenerating disease and have found it increasingly difficult to cope with the mental stimulation that accompanies rapid technological growth. In conjunction with its recreational nature, physical activity is regaining recognition for its potential as a relaxation technique.

Relaxation techniques such as meditation, neuromuscular relaxation, or autogenic training are highly preventive in nature: they contribute little to alleviation of tension once the stress response has occurred. A primary contribution of physical activity is the alleviation of stress product buildup. Dusek-Girdano focuses on three aspects of physical activity:

1. using activity to dissipate or use up the stress

products which are produced by fear, threat to the ego, or whatever has evoked the hormonal and nervous systems into defensive posture;

2. using exercise preventively to decrease one's reactivity to future stress; and

3. using physical activity on a high-level motivation plane involving a feeling of well being, tranquility, and trancendence.

During the stress response, the two adrenal medular hormones, epinephrine and norepinephrine, are pumped into the system, along with fats and sugars, to ready the body for fight or flight. In laboratory experiments, when norepinephrine is injected into the body, it makes one feel an underlying anxiety until a social situation triggers a known emotion. For example, if one is injected with norepinephrine and then annoyed by someone, the reported feeling is one of anger; if intimidated by someone or a situation, the feeling reported is one of fear. As norepinephrine is a product of the stress response, it makes one highly volatile and vulnerable to adverse emotions if it is not used for its intended purpose--physical activity.

During activity the body reacts in an ergotropic manner, that is all systems are stimulated for action, and afterwards, the systems are slowed down, dominated by the parasympathetic nervous system which occurs synonymously with tranquility. Your step is a little lighter, your attitude

more positive, and it takes more to get you upset.

c. SUMMARY

As evidenced by the literature, many studies are now confirming that exercise is beneficial to alleviating anxiety. Although research is limited in applying this theory to alcoholism treatment, the evidence is beginning to accumulate in favor of exercise as a component of recovery (Sinyor, 1982; Powell and Paffenberger, 1985; Hughes, 1984; Murphy, et al 1972; Frankel and Murphy, 1974; Cooper, 1968; DeVries, 1982). The conclusion among the experts is that it is beneficial, and in any case, will not have adverse effects on alcoholism recovery.

CHAPTER THREE

PROCEDURES FOR THE STUDY

A preselected group design was followed, using two groups, a control group and an experimental group. Fifty volunteers from Alcoholics Anonymous, Turning Point, and the Mutual Agreement programs were the subjects of this experimental study. Subjects selected had less than two years of sobriety as previously discussed in the first chapter. The groups were pre and post tested using the Spielberger State-Trait Anxiety Inventory.

The study was conducted for a four week period, whereupon the data was collected and analyzed to determine if a significant difference existed between the two groups.

a. THE SAMPLE

The subjects for this investigation were volunteers from Alcoholics Anonymous, the Mutual Agreement Program (M.A.P.) at Williamstown, New Jersey, and the Turning Point Alcoholism Program, Verona, New Jersey. These programs were chosen to insure maximum supervision of the procedures and subjects. The sites (excluding open A.A) selected typify an alcoholism rehabilitation program, based on A.A. principles which are the norm in the alcoholism treatment field. The sites (excluding open A.A.) are all monitored and evaluated by the New Jersey Division of Alcoholism, where the researcher is employed. Groups were male and female ages 18-55.

The researcher traveled to the various sites, explained the nature, significance, risks, and benefits of the study, and asked for volunteers. As the individuals volunteered they were assigned to a group and pre-tested with the Instrument (described in the "Instruments Used" section).

Preselective assignment was done because only the A.A. members and MAP-Maryville volunteers were permitted to run. The researcher encountered many problems with liability insurance issues at programs approached for the study. After many attempts fifty volunteers were obtained at the three willing programs. (see Limitations.)

1. Treatment

Two groups of twenty-five volunteers each were placed in control and experimental groups as previous described in the "sample" section.

2. The Control Group

Group one was the control group and received the pre and post tests, but no treatment. They did not have access to exercise facilities. This was a strictly monitored aspect of the study (monitored by orientation, personal contact, and telephone contact with the control group). Supervising staff further monitored this aspect of the study. Normal activity was maintained by control group subjects. A.A. volunteers were monitored by personal and telephone contact.

3. The Experimental Group

Group two was the experimental group and received the pre and post test, plus the treatment. The treatment consisted of a group of four week aerobic exercise programs in which group two participated three times per week for fifteen to thirty minutes per session. The exercise periods took place either inside a gymnasium or outdoors on athletic fields when the weather permitted. A.A. volunteers worked out on their own.

4. Orientation

After a brief warmup consisting of light calisthenics, (situps, pushups, side bends, and bicycles) and stretching (hurdlers stretch, bent-over hang, crossed ankle and achilles stretch), the subjects began to jog. Subjects were instructed to jog at a rate to maintain their individual pulse rate at 60 percent of maximum. Prior to beginning of the actual activity, running technique, aerobic activity and pacing were discussed and demonstrated to the subjects.

5.Pulse Training

As part of the orientation, the subjects were instructed in proper pulse-monitoring technique as outlined in Appendix A. In order to assure that subjects did work out at an adequate rate, monitoring was performed by random pulse-taking by staff and professional observation. Once a subject was sufficiently trained, he/she would measure their

pulse at the conclusion of the activity. This pulse monitoring technique is completely described in Appendix A, number 4. A.A. volunteers were given pulse training--but monitored their own pulse rate. This is listed as a limitation.

6. First Week Activity

The first week was spent alternating running and walking for the full 15-30 minutes. After this initial period the subjects used their own judgment to jog for as long as possible without stopping, walking only if necessary and keeping the walk brisk. To alleviate monotony, after the first week the subject chose from the following three aerobic programs:

1. The running/walking program - Jogging three times per week for 15-30 minutes. Pulse rate must be kept at 60 percent of individual maximum to insure proper aerobic effect (Cooper, 1968). For more information, see Appendix A.

2. Aerobic Weights - A high repetition, low-weight program outlined in Appendix B. Program to be performed three times per week with pulse rate at 60 percent of individual's maximum to insure proper aerobic effect (Cooper, 1968). For more information, see Appendix A.

3. Aerobic Basketball - 15-30 minutes of basketball three times per week with pulse rate at 60 percent of individual's maximum to insure proper aerobic effect

Cooper, 1968). For more information, see Appendix A.

All programs were supervised in their entirety by professional staff who have Bachelor's Degrees in various fields of discipline. All supervising staff were extensively trained in proper aerobic technique over a period of several weeks by the investigator.

b. INSTRUMENTS USED

The instrument used for this study was the Spielberger State-Trait Anxiety Inventory (STAI). It has been used extensively in research and clinical practice since its introduction more than fifteen years ago (Spielberger and Gorsuch, 1966). The STAI has been used increasingly in studies of stress-related psychiatric and medical disorders and as an outcome in research on biofeedback and various forms of treatment. The STAI is claimed in its promotional material, to be the most widely used measure of anxiety throughout the world. It consists of two 20 item self-report scales designed to assess anxiety-proneness (trait) and current level of anxiety (state).

Smith and Lay (1974) published an annotated bibliography of research concerned with, or related to, the State-Trait conception of anxiety. Approximately 150 references were listed, including journal articles, doctoral dissertations, and technical reports: the STAI was used to measure anxiety in 108 of these studies. Speilberger (1983)

has also compiled a comprehensive bibliography listing over 2,000 archival publications in which the STAI was used to measure anxiety.

While most studies with the STAI have been conducted by psychologists or medical researchers, the inventory has also been widely used by investigators from other disciplines: counseling and guidance, criminal justice, education, nursing, physical education and sports psychology, and speech and hearing (Spielberger, 1983). During the literature search, no identical studies to the current one were found utilizing STAI.

c. VALIDITY OF INSTRUMENT

The STAI provides operational measures of state and trait anxiety as used in this study. Individual STAI items were required by the developers to meet validity criteria at each stage of the test development process in order to be retained for further evaluation and validation (Spielberger, 1983). The test construction and validation process is described by Spielberger and Gorsuch (1966) and Spielberger et al (1970).

After the subjects were assigned to groups, they were pre-tested using the Spielberger State-Trait Anxiety Inventory. Testing took place at the programs (MAP-Maryville, MAP-Verona, and various A.A. locations).

d. TECHNIQUES OF COLLECTING DATA

Data was collected by the research, who traveled to each individual testing site (MAP-Verona, and various A.A. clubs), and tested each individual with the instrument.

MAP-Maryville subjects were tested by state members at that program. Each individual was pre-tested and post-tested in exactly the same manner, that is by being given the Speilberger State-Trait Anxiety Inventory. This instrument is a forty item, written, multiple-choice test, printed on computer paper. Subjects were given an explanation of what the instrument measures and a number two pencil. Subjects were asked to respond to each of the forty statements on the test firm. For more information on the organization of the group, see "Sample." (Page 20)

e. METHODS OF TREATING DATA

The data was analyzed in the following manner:

1. the means of both groups' pre-tests were analyzed to insure that both groups started out as simi:ar groups

The results were analyzed to determine if the experimental group had a significantly lower anxiety level than the control group. The results were analyzed at the .05 level of significance.

f. METHODS OF PRESENTING DATA

The results of the study are presented in the form of tables showing each tests' results (Appendix C).

CHAPTER FOUR

FINDINGS

This study was conducted to develop, implement, and analyze an aerobic exercise program for the following hypothesis:

There will be a statistically significant difference in the post-treatment anxiety levels of recovering alcoholics involved in an aerobic exercise program as compared to those in a control group as determined by an analysis of scores on the Speilberger State-Trait Anxiety Inventory. These subjects should have lowered anxiety levels.

The compiled data was analyzed by using two types of t-tests. The pre-test scores for both groups were analyzed by a t-test for "Differences Between Independent Groups." Based on the finding of $t(48) = .72$, n.s. Both groups were found to be statistically equal at the outset.

The same t-test, that is a t-test for "Differences Between Independent Groups," was then used to analyze the post-test scores for both groups to determine if a significant change took place between groups. Based on the finding of $t(48) = 1.19$, n.s. no significant change took place between groups.

Thirdly, a t-test for "Small Independent Groups" was used to analyze the pre to post test scores for the experimental group. The finding of $t(24) = 3.92$, $P < .01$ indicated that the treatment caused a significant change in the experimental group.

Finally, a t-test for "Small Independent Groups," was used to analyze the pre to post test scores for the control group. Based on the finding of $t(24) = -.1.18$, n.s. no significant change took place in the control group.

The test results are listed below:

a. A t-test for "Difference Between Independent Groups" was used to analyze the pre-test scores to determine group equality. The finding was:

$$t(48) = .72, \text{ n.s.}$$

There was not a significant difference between groups at the outset, indicating that the groups were equal.

b. A t-test for "Differences Between Independent Groups" was used to analyze the post-test scores to determine if the treatment caused a significant change in either group. The finding was:

$$t(48) = 1.19, \text{ n.s.}$$

No significant change took place between groups.

c. A t-test for "Small Independent Groups" was used to analyze the pre to post scores for the experimental group. The finding was:

$$t(24) = 3.92, \underline{P} < .01.$$

The treatment caused a significant change in the experimental group.

d. A t-test for "Small Independent Groups" was used to analyze the pre to post scores for the control group. The finding was:

$$t(24) = -1.18, \text{ n.s.}$$

No significant change took place in the control group.

e. ACCEPTANCE OR REJECTION OF THE STATED HYPOTHESIS

This study was conducted to develop, implement, and analyze an aerobic exercise program. The following hypothesis was tested:

There will be a statistically significant difference in the post-treatment anxiety levels of recovering alcoholics involved in an aerobic exercise program as compared to those in a control group as determined by an analysis of scores on the Spielberger State-Trait Anxiety Inventory. These experimental subjects will have lowered anxiety levels. Based on a pure statistical evaluation this hypothesis is rejected.

However, the findings did reveal a significant difference in a comparison of pre to post tests for the experimental group. This result suggested that the treatment did have the desired effect.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

a SUMMARY AND CONCLUSIONS

This experimental study was conducted over a period of eighteen months in an attempt to demonstrate the positive effects of physical exercise for recovering alcoholics. The stated hypothesis of the expected difference between post tests of the two groups was rejected at the .05 level of significance. However, a significant difference was obtained in a comparison of pre to post tests for the experimental group.

The researcher believes three factors resulted in the rejection of the first hypothesis:

1. The sample size. Extreme difficulty was encountered in obtaining an adequate, eligible sample. Experience shows us that a larger sample makes it much easier to validate a testing procedure. Time limits and numerous rejections from treatment facilities because of liability insurance problems prevented the researcher from gathering more subjects.

2. Regression effects. In statistical analysis there is a tendency with repeated measures to regress toward similarity or to the group mean. This is called a regression effect. This problem is particularly acute when groups are selected on the basis of extreme scores, e.g. heavy drinkers vs. light drinkers.

True experiments control this problem by selected from groups of recovering alcoholics at random rather than preselecting. Uncontrolled selection factors undermine attempts to attribute any post-test differences to the treatment (French, 1983).

3. Too short of a treatment period. This factor could not be avoided however, because the only treatment groups willing to participate in the program were four week (28 day) programs.

The significant difference in a comparison of pre to post tests for the experimental group may have occurred for the following reasons:

1. The treatment did indeed have the desired effect.

2. Variability of subjects in the control group may have been similar while variability in the experimental group was greater.

3. The pre-post test formula used for the experimental group may be more sensitive to changes than the "Difference between Independent Groups t-tests."

b. RECOMMENDATIONS

The researcher is of the opinion that a larger group to experiment with and less problems with liability insurance issues (i.e. court action for damages and several programs denying access because of these problems) would have helped support the hypothesis in a more convincing manner. Therefore

the researcher submits that ideal experimental conditions were not available and the existing conditions helped predicate the results. It is recommended that future studies of this nature be performed under more ideal experimental conditions such as:

1. The use of a greater number of subjects in the experimental group.
2. The control of liability insurance issues.
3. Better control of the experimental subjects' activities.

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"APPENDICES"

APPENDIX A

Simple Aerobic Guidelines

1. Start slowly - to start walk three times a week take a rest day after each day of walking. Rest is essential because it allows your body to adapt and recover. Do not run, play basketball or aerobically lift weights until you have worked up to comfortable brisk walk of thirty minutes.
2. Pass the talk test - when you begin to run you should maintain a speed that will let you comfortably carry on a conversation.
3. Maintain a heart rate of at least sixty percent of your maximum for at least twenty consecutive minutes at least three to four times weekly.
4. Determine your exercise heart rate by the following formula: Subtract your age from 220 and multiply by .6 (to find 60% of your maximum). To determine your exercise pulse rate, immediately after exercise take your pulse (along cartoid artery or radial artery) with your fingertips. Count the number of times your heart beats in ten seconds, then multiply by six. This is your exercise heart rate. (Hatfield, 1985; Clement, 1985) An alternative method is to count heart beats for six seconds and add a zero to the count.

APPENDIX B

Aerobic Weight Training Circuit

1. Use an appropriate warm up - walk briskly, jog slowly or stretch easily for five to ten minutes.
2. The aerobic weight circuit

Fifteen repetitions of:	One Minute of:
Bench press	Jog in place
Leg press or squat	Situps
Military press	Jog in place
Lat pulls or upright rows	Back arches
Arm curls	--
Triceps press	Jog in place
Crunches	--
Bent over rows	Situps

3. After completing circuit - jog for 5-10 minutes (slowly).
4. Repeat circuit.
5. Cool down - get pulse rate to 120 or below.
6. Five minutes of static stretching.
7. Relax and shower.

APPENDIX C

t-test Results

t-test for "Difference Between Independent Groups"

Pre-tests

$t(48) = .72$,

t-test for "Difference Between Independent Groups"

Post-tests

$t(48) = 1.19$,

t-test for "Small Independent Group"

Pre to Post for Control Group

$t(24) = -1.18$,

t-test for "Small Independent Group"

Pre to Post for Experimental Group

$t(24) = 3.92$, $P < .01$,